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**FEDERAL TRADE COMMISSION
16 CFR Part 432**

**TRADE REGULATION RULE RELATING TO POWER OUTPUT CLAIMS FOR
AMPLIFIERS UTILIZED IN HOME ENTERTAINMENT PRODUCTS**

AGENCY: Federal Trade Commission.

ACTION: Final rule.

SUMMARY: The Federal Trade Commission ("Commission" or "FTC"), pursuant to section 18 of the Federal Trade Commission Act, issues final amendments to its Trade Regulation Rule on Power Output Claims for Amplifiers Utilized in Home Entertainment Products ("Amplifier Rule" or "Rule"). The Commission amends the Rule to: exempt sellers who make power output claims in media advertising from the requirement to disclose total rated harmonic distortion and the associated power bandwidth and impedance ratings; clarify the manner in which the Rule's testing procedures apply to self-powered subwoofer-satellite combination speaker systems; and reduce the preconditioning power output requirement from one-third of rated power to one-eighth of rated power. This document constitutes the Commission's Statement of Basis and Purpose for the amendments.

EFFECTIVE DATE: The amended Rule is effective on [insert date 60 days after date of publication in the *Federal Register*].

ADDRESS: Requests for copies of the amended Rule and the Statement of Basis and Purpose should be sent to the Consumer Response Center, Federal Trade Commission, Room 130, 600 Pennsylvania Ave., N.W., Washington, DC 20580.

FOR FURTHER INFORMATION CONTACT: Dennis Murphy, Economist, Division of Consumer Protection, Bureau of Economics, (202) 326-3524, or Neil Blickman, Attorney,

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SUPPLEMENTARY INFORMATION:

Statement of Basis and Purpose

Part A - Introduction

This document is published pursuant to section 18 of the FTC Act, 15 U.S.C. 57a *et seq.*, the provisions of Part 1, Subpart B of the Commission's Rules of Practice, 16 CFR 1.14, and 5 U.S.C. 551 *et seq.* This authority permits the Commission to promulgate, modify, and repeal trade regulation rules that define with specificity acts or practices that are unfair or deceptive in or affecting commerce within the meaning of section 5(a)(1) of the FTC Act, 15 U.S.C. 45(a)(1). The Commission undertook this rulemaking proceeding as part of the Commission's ongoing program of evaluating trade regulation rules and industry guides to determine their effectiveness, impact, cost and need.

The Amplifier Rule was promulgated on May 3, 1974 (39 FR 15387), to assist consumers in purchasing power amplification equipment for home entertainment purposes by standardizing the measurement and disclosure of various performance characteristics of the equipment. On April 7, 1997, the Commission published a *Federal Register* Notice ("FRN") seeking comment on the Rule as part of an ongoing project to review all Commission rules and guides to determine their current effectiveness and impact (62 FR 16500). This FRN sought comment on the costs and benefits of the Rule, what changes in the Rule would increase its benefits to purchasers and how those changes would affect compliance costs, and whether technological or marketplace

changes have affected the Rule. The FRN also sought comment on issues related to the Rule's product coverage, test procedures, and disclosure requirements.

The comments in response to the FRN generally expressed continuing support for the Rule, stating that it has given consumers a standardized method of comparing the power output of audio amplifiers, and has created a level playing field among competitors. The comments also suggested that there have been technological and marketplace changes that may warrant modifications to the Rule's testing and disclosure requirements, and a clarification of the Rule's applicability to self-powered loudspeakers for use with personal computers and home stereo systems. Certain comments also recommended that the Commission expand the Rule's coverage to include automotive sound amplification products. On the basis of this review, the Commission determined to retain the Rule, but to seek additional comment on possible amendments to the Rule.

The Commission published an Advanced Notice of Proposed Rulemaking ("ANPR") on July 9, 1998 (63 FR 37238), seeking public comment on whether it should initiate a rulemaking proceeding by publishing a Notice of Proposed Rulemaking ("NPR") under section 18 of the FTC Act, 15 U.S.C. 57a. The ANPR solicited specific comment on whether the Commission should (1) eliminate certain disclosure requirements in media advertising; (2) clarify testing procedures for self-powered speakers; and (3) amend certain required test procedures that may impose unnecessary costs on manufacturers. The ANPR also announced that the Commission had determined not to initiate a proceeding to amend the Rule to cover power ratings for automotive sound amplification equipment. Finally, the Commission published elsewhere in the July 9, 1998 *Federal Register* a Notice of Final Action announcing a non-substantive technical amendment to

the Rule clarifying that the Rule covered self-powered loudspeakers for use in the home (63 FR 37234).

The ANPR elicited five comments.¹ Based on the comments responding to the ANPR, and on other evidence discussed below, the Commission published an NPR on July 19, 1999 (64 FR 38610).² In the NPR, the Commission proposed amending the Rule to (1) exempt sellers who make power output claims in media advertising from the requirement to disclose total rated harmonic distortion and the associated power bandwidth and impedance ratings; (2) clarify the manner in which the Rule's testing procedures apply to self-powered subwoofer-satellite combination speaker systems; and (3) reduce the preconditioning power output requirement from one-third of rated power to one-eighth of rated power.³ The NPR elicited five comments.⁴

¹ The commenters were: Consumer Electronics Manufacturers Association (CEMA)(1); Wass Audio~Digital (Wass)(2); Sonance (Sonance)(3); PHI Acoustics (PHI)(4); and Velodyne Acoustics, Inc. (Velodyne)(5).

² In accordance with section 18 of the FTC Act, 15 U.S.C. 57a, the Commission submitted this NPR to the Chairman of the Committee on Commerce, Science, and Transportation, United States Senate, and the Chairman of the Committee on Commerce, United States House of Representatives, 30 days prior to its publication in the *Federal Register*.

³ The Commission solicited public comments on its NPR until September 17, 1999. In response to a request from the Consumer Electronics Manufacturers Association, however, the Commission granted an extension of the comment period until October 15, 1999 (64 FR 51087 (Sept. 21, 1999)). CEMA recently changed its name to the Consumer Electronics Association.

⁴ The commenters were: EKSC (EKSC)(1); Audio Research (Audio Research)(2); QSC Audio (QSC)(3); Thomson Consumer Electronics, Inc. (Thomson)(4); and Consumer Electronics Manufacturers Association (CEMA)(5). The comments on the Commission's ANPR and NPR are cited as "(Name of Commenter), (designated comment number), p.____." All Rule ANPR and NPR comments are on the public record and are available for public inspection in the Public Reference Room, Room 130, Federal Trade Commission, 600 Pennsylvania Ave., NW, Washington, DC, from 8:30 a.m. to 5:00 p.m., Monday through Friday, except federal holidays.

In the NPR, the Commission also announced that pursuant to 16 CFR 1.20, it would follow expedited procedures in this proceeding, and (1) publish an NPR; (2) solicit written comments on the Commission's proposals to amend the Rule; (3) hold an informal hearing, if requested by interested parties; (4) obtain a final recommendation from staff; and (5) announce final Commission action in a notice published in the *Federal Register*.⁵ There were no requests for hearings in the five comments received in response to the NPR. The Commission, therefore, did not hold public hearings in this matter.

Part B – Analysis of Amendments

1. Amendment to Required Disclosures Section of the Amplifier Rule

a. Background

Section 432.2 of the Rule requires disclosure of maximum rated total harmonic distortion ("THD"), power bandwidth, and impedance whenever a power claim is made in any advertising, including advertising by retail stores, direct mail merchants, and manufacturers. In the ANPR, the Commission concluded tentatively that improvements in amplifier technology since the Rule's promulgation in 1974 appeared to have reduced the benefits to consumers of disclosure of THD in media advertising. In the ANPR, the Commission also concluded tentatively that an insufficient number of consumers would understand the meaning and significance of the remaining triggered disclosures concerning power bandwidth and impedance to justify their publication in media advertising. Accordingly, the ANPR sought comment on whether the Commission should initiate

⁵ 64 FR 38610, 38614. The Commission stated that using expedited procedures would support the agency's goals of clarifying existing regulations, when necessary, and eliminating obsolete or unnecessary regulation without an undue expenditure of resources, while ensuring that the public has an opportunity to submit data, views and arguments on whether the Commission should amend the Rule.

a rulemaking proceeding to amend the Rule to exempt media advertising, including advertising on the Internet, from disclosure of THD and the associated power bandwidth and impedance ratings when a power output claim is made. In the ANPR, the Commission tentatively concluded further that the proposed exemption should be conditioned on the requirement that the primary power output specification disclosed in any advertising distributed through the media be the manufacturer's rated minimum sine wave continuous average power output, per channel, at an impedance of 8 ohms, or, if the amplifier is not designed for an 8-ohm impedance, at the impedance for which the amplifier is primarily designed.

Finally, the ANPR explained the Commission's tentative conclusion that publication of all other power output claims currently subject to the Rule, including those appearing in manufacturer specification sheets that are either in print or reproduced on the Internet, should continue to trigger the requirement that the seller provide the full complement of disclosures concerning power bandwidth, maximum harmonic distortion, and impedance, so that interested consumers could obtain this information prior to purchase.

The Commission received four comments on the tentatively proposed exemption of THD, bandwidth, and impedance disclosures in media advertising. CEMA, the principal trade association for the electronics industry, supported the proposed exemption, including the requirement that the primary power output specification disclosed in media advertising be continuous per-channel output at an 8-ohm impedance (unless the amplifier is designed primarily for a different impedance level).⁶ Velodyne, a manufacturer of powered loudspeakers, also supported the exemption of THD and bandwidth disclosures in media advertising, stating that

⁶ CEMA, (1), pp. 2-3.

they contain little useful information for today's consumer.⁷ This commenter suggested, however, that the standardized impedance value for power output claims be 4 ohms rather than the proposed 8 ohms.⁸ No explanation was provided for this suggestion. Wass opposed elimination of the required THD, bandwidth, and impedance disclosures in advertising, stating that sellers could take unfair advantage of the consumer through in-store sales techniques that obscure the true performance capabilities of an amplifier.⁹ Sonance stated simply that the relationship between power and distortion is vital to specifying power output, and recommended against the tentatively proposed exemption.¹⁰

Based on its review of the comments on its ANPR, the Commission stated in the NPR that it had reason to believe that the disclosure of THD, power bandwidth, and impedance in media advertising that contains a triggering power output claim no longer provided sufficient consumer benefit to justify the associated increase in advertising costs. The Commission concluded in both the ANPR and the NPR that very few amplifiers in today's market generate high levels of THD (*e.g.*, more than one percent) using the FTC testing protocol. Further, the Commission concluded that those few amplifiers that do generate appreciable levels of THD tend to be very expensive vacuum tube designs that are sold to a specialized group of consumers that may not consider THD specifications an important consideration in their purchase decisions. Thus, it did not appear that sales personnel at retail stores would have an appreciable incentive to mislead

⁷ Velodyne, (5), p. 1.

⁸ *Id.*

⁹ Wass, (2), p. 3.

¹⁰ Sonance, (3), p. 1.

consumers concerning the distortion characteristics of an amplifier. Finally, the Commission concluded that consumers who are interested in the Rule's THD, power bandwidth, and impedance specifications would be able to find such information relatively easily in product brochures at retail stores or on the Internet.

Commenters on the ANPR did not agree on which impedance value should serve as the standard for power output claims in media advertising under the tentatively proposed disclosure exemption. CEMA endorsed the value of 8 ohms suggested in the ANPR. Velodyne, however, commented that the standardized impedance value should be 4 ohms. The Commission concluded in the NPR that, under the proposed exemption, for amplifiers designed to drive a specific loudspeaker in an integrated powered configuration, the seller could base power output claims on an impedance of 4 ohms, if the amplifier is powering a loudspeaker that is rated at a nominal impedance of 4 ohms. Although the Commission stated in the NPR that it had reason to believe that the majority of non-powered loudspeakers are rated at a nominal impedance of 8 ohms, and that this value should therefore be adopted as the basis for power output claims in media advertising for separate stand-alone amplifiers, the NPR solicited further comment on whether the Commission's tentative conclusion on this issue was correct.

Accordingly, in the NPR the Commission proposed amending section 432.2 of the Rule to exempt advertising disseminated through the media, including advertising on the Internet, from disclosure of total rated harmonic distortion and the associated power bandwidth and impedance ratings when a power output claim is made. The Commission further proposed that the exemption for advertising disseminated through the media be conditioned on the requirement that the primary power output specification disclosed in any media advertising be the manufacturer's

rated minimum sine wave continuous average power output, per channel, at an impedance of 8 ohms, or, if the amplifier is not designed for an 8-ohm impedance, at the impedance for which the amplifier is primarily designed. Publication of all other power output claims currently subject to the Rule, including those appearing in manufacturer specification sheets that are either in print or reproduced on the Internet, would continue to trigger the requirement that the seller provide the full complement of disclosures concerning maximum harmonic distortion, power bandwidth, and impedance, so that interested consumers could obtain this information prior to purchase.

b. Discussion of NPR Comments

The Commission received four comments on the proposed exemption of THD, bandwidth, and impedance disclosures in media advertising. Thomson Consumer Electronics, which markets audio and video equipment under the RCA and ProScan brand names, supported the proposed exemption, stating that “...the consumer typically understands little from these disclosures.”¹¹ Thomson recommended, however, that the Commission monitor developments once the exemption is in place to ensure that industry members do not take advantage of the disclosure requirements to inflate power output claims.¹²

Audio Research Corporation, a manufacturer of electronic audio equipment specializing in vacuum tube designs, opposed the proposed exemption, stating that “[c]onsumers are a lot more sophisticated than consumers were when the original rules were issued” and, therefore,

¹¹ Thomson, (4), p. 1.

¹² *Id.*, pp. 1-2.

understand the THD disclosures.¹³ Audio Research agreed, however, that the Commission should select an impedance of 8 ohms as the basis for primary power output specifications in the event the Commission adopts the proposed exemption of THD disclosures in media advertising.¹⁴

QSC Audio Products, a manufacturer of professional audio power amplifiers, did not believe that the currently required distortion and power bandwidth disclosures were sufficiently burdensome to justify the proposed exemption in media advertising. Like Audio Research, however, QSC supported an impedance value of 8 ohms as the basis for primary power output specifications in media advertising should an exemption be adopted, stating that 8 ohms “...is a reasonable value for typical impedance.”¹⁵

CEMA reversed its position taken in earlier comments in this rulemaking proceeding and opposed the proposed exemption. According to CEMA, members recently have “...expressed concerns about inconsistent power output claims in retail advertising for amplifiers and receivers, especially multichannel products.”¹⁶ These members report that certain relatively low cost multichannel receivers, for which distortion information in advertising is not disclosed, have distortion levels well in excess of one percent at rated power. Although CEMA continues to regard total harmonic distortion levels below one percent are inaudible to consumers, CEMA stated that levels above that amount can become significant. As a result, CEMA stated that “...consumers are unable to make accurate price-versus-performance comparisons for such

¹³ Audio Research, (2), p. 1.

¹⁴ *Id.*

¹⁵ QSC, (3), p. 1.

¹⁶ CEMA, (5), p. 2.

multichannel audio products.”¹⁷ CEMA did not provide the Commission with any specific examples of such problematic advertisements for multichannel amplifiers. Nor did CEMA state that they were aware of any similar advertisements for conventional monophonic or two-channel stereo amplifiers.

CEMA proposed that the Commission help consumers make “apples-to-apples” comparisons of amplifiers by setting certain minimum requirements for the various elements of the current THD disclosures.¹⁸ CEMA maintained that such standardization would prevent power output claims from becoming “...qualitative measurements used by manufacturers (or retailers) to differentiate products with respect to consumer’s perceptions of quality.”¹⁹ Specifically, CEMA recommended that total harmonic distortion be disclosed as “less than or equal to one percent.” Under CEMA’s recommendation, “(M)anufacturers and retailers would continue to be free to make secondary, qualitative claims of lower distortion in order to differentiate their products further (*e.g.*, ‘0.5% THD,’ ‘.01% THD,’ etc.).”²⁰ CEMA did not indicate what form of disclosure would be required in the event an amplifier’s THD at rated power was greater than one percent.

To further standardize distortion disclosures, CEMA proposed that the “power bandwidth” associated with the rated THD disclosure be the single frequency 1000 Hz, rather than the customary 20Hz-20kHz. CEMA commented that “..claims concerning bandwidth, especially claims about wide bandwidth, could be regarded as qualitative claims to the

¹⁷ *Id.*

¹⁸ *Id.*, p. 3.

¹⁹ *Id.*

²⁰ *Id.*

consumer.”²¹ CEMA recommended that the Commission adopt 1000 Hz as the basis for primary power output claims, and allow advertisers to make secondary qualitative claims, such as “Ultra-wide Bandwidth” or “20-20 kHz” in advertising or at the point of sale for purposes of product differentiation.²²

Finally, in addressing the issue of the appropriate impedance value for primary power output claims, CEMA stated that “...loudspeakers today typically exhibit impedances of 4 to 8 ohms.”²³ CEMA recommended that primary power output claims be based on an impedance value of 6 ohms. CEMA did not specify whether most loudspeakers are rated at an impedance of 8 ohms, 4 ohms, or some impedance value within that range.

c. Rule Amendment and Reasons Therefor

Based on its review of the comments and other evidence contained in this rulemaking proceeding, the Commission has reason to believe that the disclosure of THD, power bandwidth, and impedance in media advertising that contains a triggering power output claim no longer provides sufficient consumer benefit to justify the associated increase in advertising costs. One commenter on the NPR supported the proposed exemption. Two other commenters opposed the proposed exemption, but did not provide any evidence that consumers typically understand the significance of the THD, power bandwidth, and impedance disclosures.

Finally, although CEMA had supported the proposed exemption in its comment on the ANPR, it opposed the proposed exemption in its comment on the NPR. The basis for this change

²¹ *Id.*, pp. 2-3.

²² *Id.*, p. 3.

²³ *Id.*

in position was based on its allegation that power output claims in certain advertising for multi-channel theater amplifiers were based on very high levels of total harmonic distortion. CEMA did not provide any evidence or suggest that advertisements for conventional monophonic or stereophonic amplifiers contain power output claims based on similarly high levels of THD.

The Commission presented evidence in the ANPR indicating that very few amplifiers in today's market generate appreciable levels of THD (*e.g.*, more than one percent) at rated power using the FTC testing protocol for monophonic or stereophonic amplifiers. The Commission is publishing elsewhere in this *Federal Register* a Supplemental Notice of Proposed Rulemaking that addresses testing and disclosure issues specific to multi-channel amplifiers such as those used in home theater applications. The Commission believes that the concerns raised by CEMA will be addressed more appropriately in that rulemaking proceeding. The Commission does not believe that CEMA's comment provides a basis for rejecting the proposed exemption of THD, power bandwidth, and impedance disclosures in media advertising for conventional monophonic and stereophonic amplifiers. Similarly, the Commission does not believe CEMA has provided evidence that would provide a basis for altering the current requirements governing the format of THD disclosures or the choice of power bandwidth for power output claims for conventional monophonic and stereophonic amplifiers.

Two of the commenters on the NPR supported the proposal to base power output claims on a nominal impedance of 8 ohms, or on the nominal impedance for which the amplifier is primarily designed. CEMA proposed a value of 6 ohms, but did not provide any evidence that this value was more representative of loudspeakers currently in use than was the proposed value of 8 ohms.

Accordingly, the Commission is amending section 432.2 of the Rule to exempt advertising disseminated through the media, including advertising on the Internet, from disclosure of total rated harmonic distortion and the associated power bandwidth and impedance ratings when a power output claim is made. The exemption for advertising disseminated through the media is conditioned on the requirement that the primary power output specification disclosed in any media advertising be the manufacturer's rated minimum sine wave continuous average power output, per channel, at an impedance of 8 ohms, or, if the amplifier is not designed for an 8-ohm impedance, at the impedance for the amplifier is primarily designed. Publication of all other power output claims currently subject to the Rule, including those appearing in any product brochure or manufacturer specification sheets that are either in print or reproduced on the Internet, will continue to trigger the requirement that the seller provide the full complement of disclosures concerning maximum total harmonic distortion, power bandwidth, and impedance, so that interested consumers can obtain this information prior to purchase.

2. Amendment Relating to Self-Powered Loudspeakers

a. Background

When the FRN was published, the Rule did not specifically mention self-powered speakers as an example of sound amplification equipment manufactured or sold for home entertainment purposes. In the FRN, the Commission solicited comment on its tentative conclusion that the Rule covers: (A) self-powered speakers for use with (1) home computers, (2) home sound systems, (3) home multimedia systems; and (B) other sound power amplification equipment for home computers. On July 9, 1998, the Commission published in the *Federal Register* a non-

substantive technical amendment to the Rule to clarify that the Rule applies to the types of self-powered loudspeakers enumerated above (63 FR 37234).

In the ANPR published elsewhere in the July 9, 1998 *Federal Register* (63 FR 37238), the Commission explained that comments received in response to the FRN indicated that a clarification was needed concerning the testing procedure that should be followed in applying the Rule's continuous power rating protocol to self-powered subwoofer-satellite combination speaker systems that employ two or more power amplifiers sharing a common power supply. These comments recommended two alternative approaches for such combination self-powered speakers. The first proposed procedure was for power measurements to be made with all associated channels of both the subwoofer and satellite amplifiers driven simultaneously to full power using a test tone at the system's crossover frequency. The second proposal was to allow manufacturers of such equipment to test the subwoofer and satellite amplifiers separately over their respective frequency bandwidth.

In the ANPR, the Commission sought comment on its tentative conclusion that the second procedure was more appropriate, given the types of power demands combination self-powered speakers would most likely encounter in actual home use. The Commission received three comments on its proposal to amend section 432.2 of the Rule to include a note stating that, for self-powered combination speaker systems that employ two or more amplifiers dedicated to different portions of the audio frequency spectrum, only those channels dedicated to the same audio frequency spectrum need be fully driven to rated per channel power under section 432.2(a)(2).

CEMA supported the Commission's clarification, stating that this approach would allow self-powered subwoofers to be rated over their operating frequency range and at their appropriate impedance value.²⁴ Sonance also endorsed the tentative proposal to restrict the power tests of such equipment to each amplifier's intended operating range.²⁵ Velodyne disagreed with the Commission's proposal and stated that power rating tests for self-powered combination subwoofer-satellite loudspeakers should be conducted with all channels operating simultaneously. It proposed that the amplifiers driving the subwoofer and satellites should be given a test signal within each amplifier's typical range, and suggested a combination 60Hz-1,000Hz tone.²⁶ Velodyne stated that the power supply was the most costly and critical component determining an amplifier's continuous power output capability, and that the primary quantitative measurement of interest to consumers is the amount of watts the power supply can deliver.²⁷

Based on the comments submitted in response to the FRN and the ANPR, the Commission tentatively concluded in the NPR that the most appropriate method of testing self-powered combination subwoofer-satellite loudspeaker systems under the Rule was to require simultaneous operation only of those channels dedicated to the same portion of the audio frequency spectrum. The Commission stated in both the ANPR and the NPR that it did not have sufficient evidence to conclude that in-home use, under even strenuous conditions, typically would place maximum continuous power demands simultaneously on both the subwoofer and

²⁴ CEMA, (1), p. 3.

²⁵ Sonance, (3), p. 1.

²⁶ Velodyne, (5), p. 3.

²⁷ *Id.*

satellite amplifiers at the crossover frequency. Rather, the Commission concluded in the NPR that such demands would be more likely to occur in portions of the audio spectrum that would be assigned primarily either to the subwoofer amplifier or the satellite amplifier. In contrast, conventional stand-alone stereo amplifiers, which incorporate left and right-channel amplifiers that must reproduce signals covering the full musical frequency bandwidth, would more commonly be required to meet simultaneous continuous power demands that are present in both channels (such as might occur when a pipe organ plays a sustained pedal tone in the deep bass).

In addition, the Commission stated in the NPR that a simultaneous power test of both the subwoofer and the satellite amplifiers would, from a practical standpoint, require a single test signal at the crossover frequency, or a single combination set of tones, such as the 60Hz-1,000Hz composite signal suggested by Velodyne. The Commission concluded that the resulting power and THD specifications might not be valid over the full frequency range over which each amplifier was designed to operate.

Accordingly, in the NPR the Commission proposed amending section 432.2(a)(2) of the Rule to include a clarifying note stating that, when measuring maximum per channel output of self-powered combination speaker systems that employ two or more amplifiers dedicated to different portions of the audio frequency spectrum, only those channels dedicated to the same audio frequency spectrum need be fully driven to rated per channel power.

b. Discussion of NPR Comments

The Commission received five comments concerning the proposed clarification of testing procedures for self-powered combination speaker systems. Thomson Consumer Electronics and

Audio Research endorsed the proposal without qualification.²⁸ QSC Audio stated that it had no strong opinion on the proposed clarification, and was “...willing to support the proposed regime of loading only one frequency range at a time.”²⁹ QSC noted, however, that a “rational” standard for powered speakers would rate maximum *acoustic* output, distortion, and frequency bandwidth as a system, “...without regard for internal details such as amplifier power and driver impedance.”³⁰ QSC cautioned, however, that such acoustic measurements initially “...will not be familiar to consumers and such specifications tend to be overly detailed.”³¹

Two other commenters explicitly favored a testing protocol based on the acoustic output of the self-powered speaker system over a protocol limited to the performance of the amplifier(s) alone. These commenters proposed testing procedures that would apply to all self-powered speaker systems, whether individual powered subwoofers, powered satellite speakers, or self-powered combination subwoofer-satellite speakers that share a common power supply. Specifically, EKSC commented that the separate testing of amplifiers contained in self-powered speakers “...does the consumer little good.”³² EKSC proposed a two-part test procedure that would measure (1) the total harmonic distortion produced by a self-powered loudspeaker when producing a sound pressure level of 96 decibels, and (2) the maximum sound pressure level the loudspeaker could produce without exceeding 10 percent harmonic distortion. According to

²⁸ Thomson, (4), p. 2; Audio Research, (2), p. 2.

²⁹ QSC, (3), p. 1.

³⁰ *Id.*, pp. 1-2.

³¹ *Id.*, p. 2.

³² EKSC, (1), p. 1.

EKSC, results from the first test would allow consumers to compare the harmonic distortion characteristics of self-powered loudspeaker systems when producing a standard level of sound pressure. The second test would provide consumers with comparative information on the maximum sound pressure self-powered speaker systems could produce prior to the onset of severe distortion.³³

CEMA also favored a test protocol based on acoustic output measurements for self-powered loudspeaker systems. CEMA commented that an amplifier power rating in isolation “...inherently ignores the performance capability of the acoustical portion of the system, and hence is incomplete and inaccurate as a performance comparison tool.”³⁴ CEMA stated that an appropriate acoustical output standard would measure such performance characteristics as the sensitivity of the loudspeaker system (expressed as sound pressure output level per input volt), and the maximum sound pressure output that the system can achieve within specified frequency bandwidth and distortion limits.³⁵

c. Rule Amendment and Reasons Therefor

Based on the comments submitted in response to the NPR, the Commission concludes that the most appropriate method of testing self-powered combination subwoofer-satellite loudspeaker systems under the Rule is to restrict measurements to the electrical performance of the component amplifier(s) alone, and to require simultaneous operation only of those channels dedicated to the

³³ *Id.*, pp. 1-2.

³⁴ CEMA, (5), p. 4.

³⁵ *Id.*, pp. 4-5.

same portion of the audio frequency spectrum. Three commenters endorsed this procedure or found it acceptable. None of the commenters recommended any alternative method of measuring the power output characteristics of amplifiers contained in such self-powered speaker systems.

Two commenters recommended that the Commission reject any test protocol limited to measuring the power output of the amplifier alone, and proposed instead that the Commission develop and adopt a testing and disclosure methodology based on the acoustic output of the entire self-powered speaker system. The Commission does not necessarily disagree that, at least in principle, such a protocol would provide more complete and meaningful comparative performance information for consumers than would a protocol limited to the power and distortion performance of the amplifier(s) alone. The Commission does not, however, have the necessary expertise and resources to undertake such a complex and uncertain rulemaking proceeding. The Commission believes that the development of an acoustic output measurement and disclosure protocol for self-powered loudspeakers would be, more appropriately, the responsibility of industry members and their trade associations.

Further, many marketers of self-powered loudspeakers may well continue to advertise separate power output measurements for the component amplifiers in these systems before, and even after, any such acoustic output protocol is formulated. Thus, there would still be a need to clarify the testing procedure for self-powered combination satellite and subwoofer loudspeakers under the Rule so that consumers will not be confused by conflicting power output claims. The Commission believes, therefore, that the Rule's continuous power output protocol and any future industry acoustic output protocol could coexist in a complementary fashion.

Accordingly, the Commission is amending section 432.2(a)(2) to include a clarifying note stating that, when measuring maximum per channel output of self-powered combination speaker systems that employ two or more amplifiers dedicated to different portions of the audio frequency spectrum, only those channels dedicated to the same audio frequency spectrum need be fully driven to rated per channel power.

3. Amendments to the Amplifier Rule Preconditioning Requirement

a. Background

Section 432.3(c) of the Rule specifies that an amplifier must be preconditioned by simultaneously operating all channels at one-third of rated power output for one hour using a sinusoidal wave at a frequency of 1,000Hz. The ANPR sought comment on whether the Commission should amend the Rule to reduce the preconditioning power output requirement from one-third of rated power to a lower figure, such as one-eighth of rated power.

CEMA supported reducing the preconditioning power output requirement to below the current one-third power, stating that the current requirement is "beyond what can be expected through normal use in the home" and is "harsh and unrealistic."³⁶ CEMA claimed that in order to meet the physical conditions presented by the Rule's existing preconditioning requirement, manufacturers must design and incorporate in amplifiers larger and costlier heat sinks.³⁷ CEMA listed several alternative solutions, including operation at idle during preconditioning, operation at a small fixed power representative of average power during typical in-home operation, or

³⁶ CEMA, (1), p. 2.

³⁷ *Id.*

preconditioning at one-eighth power. CEMA further stated that the one-eighth power option "has the virtue of being consistent with current industry and international testing specifications."³⁸

Velodyne stated that a preconditioning period is not really necessary, but that the Commission should follow Underwriters Laboratories' ("UL") one-eighth power requirement if the preconditioning requirement is retained.³⁹ Velodyne did not provide any explanation for its conclusion that no preconditioning period of any kind was necessary under the Rule.

Wass concluded, from a series of calculations, that reducing the preconditioning requirement from one-third to one-eighth power would reduce the thermal stress (expressed in "watts of heat" delivered to an amplifier's heatsink) by approximately 24 percent.⁴⁰ Wass, however, opposed amending the Rule to provide such a reduction in specified preconditioning power output because the consumer would get "a poorer unit."⁴¹ Wass did not provide any evidence, however, that would allow the Commission to compare the magnitude of the alleged reduction in amplifier quality with the magnitude of the associated reduction in manufacturing costs resulting from the one-eighth power preconditioning standard.

³⁸ *Id.*

³⁹ Velodyne, (5), p. 1.

⁴⁰ Wass, (2), p. 2.

⁴¹ *Id.*

Finally, Sonance stated that the one-third power preconditioning requirement should be retained and enforced evenly.⁴² Sonance saw no technical problem with the requirement, stating that many generations of consumer electronic products have been built to this standard.⁴³

Based on the comments, the Commission tentatively concluded that the current one-third power preconditioning requirement imposed unnecessary costs on amplifier manufacturers and was not needed to measure amplifiers accurately under conditions that represent actual in-home use. Accordingly, in the NPR the Commission proposed amending section 432.3(c) of the Rule by reducing the specified per-channel power output during preconditioning from one-third of rated power output for one hour to one-eighth of rated power output for one hour.

b. Discussion of NPR Comments

The Commission received four comments on the proposed amendment. Audio Research opposed the proposed amendment, stating that “...the purpose of the original rule-making was to insure an acceptable level of quality (the 1/3 power, 1 hour pre-conditioning test) as well as a reasonable level of static performance.”⁴⁴ The remaining three commenters all supported the proposed reduction in the preconditioning power output requirement.

QSC stated that “we strongly support reducing the pre-conditioning power level to 1/8 of rated power.” QSC noted that this power output level matches that “...used by safety agencies to assess AC current draw and component temperature rise, and also corresponds to the highest

⁴² Sonance, (3), p. 1.

⁴³ *Id.*

⁴⁴ Audio Research, (2), p. 1.

likely average program level, where some attempt is made to limit gross clipping.”⁴⁵ Thomson Consumer Electronics stated that the proposed one-eighth power level for preconditioning would provide “...a more realistic condition to that experienced in typical operation of the amplifier and represents a reasonable manner in which to precondition for testing.”⁴⁶

CEMA reiterated its earlier support for this amendment, citing attendant reductions in manufacturing and testing costs.⁴⁷ CEMA also stated that the proposed reduction in the preconditioning power output requirement would facilitate preconditioning at an impedance of four ohms, and thus allow more manufacturers of high power amplifiers to provide realistic power output specifications for this impedance load.⁴⁸ Finally, CEMA commented that the proposed amendment would render the preconditioning requirement more consistent with testing protocols for UL and the European Union, which “...typically specify amplifier preconditioning at one-eighth of rated power for a period of less than one hour.”⁴⁹ In this regard, CEMA proposed that the Commission reduce the required preconditioning period from one hour to thirty minutes.⁵⁰

c. Rule Amendment and Reasons Therefor

⁴⁵ QSC, (3), p. 2.

⁴⁶ Thomson, (4), p. 1.

⁴⁷ CEMA, (5), p. 5.

⁴⁸ *Id.*

⁴⁹ *Id.*

⁵⁰ *Id.*

Based on the comments submitted in response to the NPR, the Commission concludes that the current one-third power preconditioning requirement imposes unnecessary costs on amplifier manufacturers and should be reduced to one-eighth of rated power. All but one of the commenters on the NPR supported this reduction. The dissenting commenter was concerned that lowering the preconditioning power requirement would jeopardize the Rule's intended purpose of helping assure an acceptable level of quality in the amplifier market.

The Commission believes that the proposed amendment is consistent with the original intent of the Rule. The preconditioning requirement was not imposed as a quality-assurance mechanism that would place maximum stress on an amplifier's heat dissipation capabilities. This requirement merely was intended to bring an amplifier to normal operating temperature and to stabilize its components so that the subsequent power output tests would provide performance specifications representative of the performance consumers could expect in normal operation in the home. Indeed, at the time the Rule was promulgated in 1974, the Commission was not aware that preconditioning at one-third of rated power would place such severe thermal stress on solid state amplifiers, particularly high power units operating into a resistive load of four ohms.

Only one of the NPR comments, and none of the comments received in connection with earlier phases of this proceeding, recommended a preconditioning period shorter than one hour. The one commenter that recommended a shorter preconditioning period of thirty minutes did not provide any technological justifications for the proposed reduction in preconditioning time. Thus, the Commission does not believe that the Rulemaking record provides an adequate basis for amending the one-hour preconditioning period prescribed by the Rule.

Accordingly, the Commission is amending section 432.3(c) of the Rule by reducing the specified per-channel power output during preconditioning from one-third of rated power output for one hour to one-eighth of rated power output for one hour.

d. Additional Preconditioning Amendment

As discussed in Part B(2) above, in the NPR the Commission proposed amending the Rule to clarify the manner in which power tests should be conducted for self-powered subwoofer-satellite combination loudspeaker systems. In reviewing the technical issues related to this proposed amendment, the Commission tentatively concluded in the NPR that clarification also was required concerning the manner in which powered subwoofers should be preconditioned under the Rule.

Section 432.3(c) of the Rule specifies a preconditioning sinusoidal test tone of 1,000Hz. The Commission stated in the NPR that most self-powered subwoofer systems incorporate crossover circuitry that filters out frequencies above the bass range. Depending upon the crossover frequency and the steepness of the crossover slope, such crossover circuitry may severely attenuate a test tone of 1,000Hz and prevent the subwoofer amplifier from being driven to one-third rated power (as required by the Rule at the time the NPR was published), or even to one-eighth of rated power (as required by the amended Rule). Thus, it appeared to the Commission that testers of self-powered subwoofers would need to select a preconditioning frequency considerably lower than 1,000Hz.

The Commission, therefore, tentatively concluded in the NPR that the Rule should be amended to clarify the preconditioning procedure for self-powered subwoofers. The Commission also concluded, however, that any such amendment should not specify the precise frequency of

the test tone that is to be used in preconditioning powered subwoofers. The Commission stated that powered subwoofers may differ widely in the portion of the bass spectrum over which they are designed to operate, and, consequently, there may not be a single preconditioning frequency that is appropriate for all powered subwoofers. The Commission tentatively concluded in the NPR, therefore, that testers of powered subwoofers should have the flexibility to choose for the sinusoidal preconditioning signal any frequency within the intended operating bandwidth of the subwoofer amplifier that will allow the amplifier to be driven for one hour to the required proportion of rated power output.

Accordingly, in the NPR the Commission proposed amending section 432.3(c) of the Rule by adding an explanatory note stating that for amplifiers utilized as a component in a self-powered subwoofer system, the sinusoidal wave used as a preconditioning signal may be any frequency within the amplifier's intended operating bandwidth that will allow the amplifier to be driven to one-eighth of rated power for one hour.

e. Discussion of NPR Comments

The Commission received only one comment that directly addressed the choice of preconditioning frequency for self-powered subwoofer systems. Audio Research supported the proposed amendment, stating that such subwoofers should be preconditioned "...at any frequency within the claimed bandwidth."⁵¹ Another commenter on the NPR, QSC Audio, stated that powered speakers should be preconditioned using "band-limited pink noise."⁵² QSC, however, did not distinguish between subwoofers and other types of powered loudspeaker systems, and did

⁵¹ Audio Research, (2), p. 2.

⁵² QSC, (3), p. 2.

not specify which frequency ranges should be selected as appropriate band-limited pink noise test signals. Finally, CEMA and EKSC restricted their comments on self-powered speakers to the need for acoustic output tests of the entire speaker system, and did not address the choice of preconditioning test signal frequency for the amplifiers contained in self-powered subwoofers.

f. Rule Amendment and Reasons Therefor

Based on its review of the NPR comments, the Commission has concluded that testers of self-powered subwoofers should have the flexibility to choose for the sinusoidal preconditioning signal any frequency within the intended operating bandwidth of the subwoofer amplifier that will allow the amplifier to be driven for one hour to one-eighth of rated power output. No comments stated that this approach was technologically flawed or otherwise undesirable. One commenter specifically endorsed the proposed preconditioning amendment. Accordingly, the Commission is amending section 432.3(c) of the Rule by adding an explanatory note stating that for amplifiers utilized as a component in a self-powered subwoofer system, the sinusoidal wave used as a preconditioning signal may be any frequency within the amplifier's intended operating bandwidth that will allow the amplifier to be driven to one-eighth of rated power for one hour.

Part C - Regulatory Analysis And Regulatory Flexibility Act Requirements

Under section 22 of the FTC Act, 15 U.S.C. 57b, the Commission must issue a preliminary regulatory analysis for a proceeding to amend a rule only when it (1) estimates that the amendment will have an annual effect on the national economy of \$100,000,000 or more; (2) estimates that the amendment will cause a substantial change in the cost or price of certain categories of goods or services; or (3) otherwise determines that the amendment will have a significant effect upon covered entities or upon consumers. A final regulatory analysis is not

required because the Commission finds that the amendments to the Rule will not have such effects on the national economy, on the cost of sound amplification equipment, or on covered businesses or consumers.

The Regulatory Flexibility Act ("RFA"), 5 U.S.C. 601-12, requires that the agency conduct an analysis of the anticipated economic impact of the proposed amendments on small businesses. The purpose of a regulatory flexibility analysis is to ensure that the agency considers impact on small entities and examines regulatory alternatives that could achieve the regulatory purpose while minimizing burdens on small entities. Section 605 of the RFA, 5 U.S.C. 605, provides that such an analysis is not required if the agency head certifies that the regulatory action will not have a significant economic impact on a substantial number of small entities.

Since the Amplifier Rule covers manufacturers and importers of power amplification equipment for use in the home, the Commission preliminarily concluded in the NPR that any amendments to the Rule may affect a substantial number of small businesses. Nevertheless, the Commission concluded that the proposed amendments would not have a significant economic impact upon such entities. Specifically, the Commission stated that the proposed change in the preconditioning protocol and the proposed exemption of disclosure of THD, bandwidth, and impedance specifications in media advertising would allow a moderate reduction in amplifier manufacturing and advertising costs that would benefit both small and large businesses. The Commission also concluded that the proposed clarification of testing procedures for combination subwoofer-satellite self-powered loudspeaker systems was the least burdensome application of the Rule among the alternative proposals suggested by commenters, and would not have a significant

or disproportionate impact on the testing costs of small manufacturers of such power amplification equipment.

Based on available information, therefore, in the NPR the Commission certified under the RFA that the proposed amendments to the Amplifier Rule, if promulgated, would not have a significant economic impact on a substantial number of small businesses. To ensure that no significant economic impact was being overlooked, however, the Commission requested comments on this issue. The Commission received no comments on this aspect of its NPR. Consequently, the Commission concludes that a regulatory flexibility analysis is not required, and certifies, under section 605 of the RFA, 5 U.S.C. 605, that the Rule it has adopted will not have a significant economic impact on a substantial number of small entities.

Part D - Paperwork Reduction Act

The Amplifier Rule contains various information collection requirements for which the Commission has obtained clearance until August 31, 2002, under the Paperwork Reduction Act, 44 U.S.C. 3501 *et seq.*, Office of Management and Budget ("OMB") Control Number 3084-0105. In the NPR, the Commission preliminarily concluded that the proposed amendments to the Rule to clarify the manner in which the Rule's testing procedures apply to self-powered subwoofer-satellite combination speaker systems, and reduce the preconditioning power output requirement from one-third of rated power to one-eighth of rated power, if enacted, would not increase or alter the paperwork burden associated with the Rule's requirements. The Commission stated in the NPR that these amendments would not increase the paperwork burden for businesses because for purposes of performing the tests necessary for affected entities to make the disclosures required under the Rule amplifiers must continue to be preconditioned for one hour. In the NPR,

the Commission also preliminarily concluded that the proposed amendment of the Rule to exempt from media advertising disclosure of an amplifier's total rated harmonic distortion and the associated power bandwidth and impedance ratings when a power output claim for an amplifier is made would reduce the Rule's paperwork burden. Although the exemption for media advertising would be conditioned on the requirement that the amplifier's primary power output specification continue to be disclosed in any media advertising, the Commission stated that the net effect of the proposed amendment would be to reduce the Rule's paperwork burden for businesses. To ensure that no significant paperwork burden was being overlooked, however, the Commission requested comments on this issue. The Commission received no comments on this aspect of its NPR.

Thus, the Commission concludes on the basis of the information now before it that the amendments to the Amplifier Rule will decrease the paperwork burden associated with compliance with the Rule. As discussed, the Rule requires disclosures if an advertisement makes a power output claim. The Commission has estimated that approximately 1,200 advertisements annually would be required to carry the FTC disclosures. The cost of these disclosures is limited to the time needed to draft and review the language pertaining to power output specifications. The Commission has estimated the time involved for this task to be a maximum of one hour per advertisement, for a total burden of 1,200 hours.⁵³ Because the Commission is amending the Rule to exempt from media advertising disclosure of an amplifier's total rated harmonic distortion and the associated power bandwidth and impedance ratings, the Commission estimates the time involved for the aforementioned tasks to be a maximum of 45 minutes per advertisement, for a total burden of 900 hours. Thus, the net effect of the amendment is to reduce the Rule's

⁵³ 64 FR 36877, 36879 (July 8, 1999).

paperwork burden for businesses by 900 hours. In addition, since there were no additional “collection of information” requirements included in the proposed amendments to the Rule, the Commission was not required to submit them to OMB during this proceeding for clearance under the Paperwork Reduction Act.

List of Subjects in 16 CFR Part 432

Amplifiers, Home entertainment products, Trade practices.

For the reasons set out in the preamble, 16 CFR Part 432 is amended as follows:

Part 432 - POWER OUTPUT CLAIMS FOR AMPLIFIERS UTILIZED IN HOME ENTERTAINMENT PRODUCTS

1. The authority citation for part 432 continues to read as follows:

Authority: 38 Stat. 717, as amended; (15 U.S.C. 41-58).

2. Section 432.2 is revised to read as follows:

§ 432.2 Required disclosures.

(a) Whenever any direct or indirect representation is made of the power output, power band or power frequency response, or distortion characteristics of sound power amplification equipment, the following disclosure shall be made clearly, conspicuously, and more prominently than any other representations or disclosures permitted under this part: the manufacturer’s rated minimum sine wave continuous average power output, in watts, per channel (if the equipment is designed to amplify two or more channels simultaneously) at an impedance of 8 ohms, or, if the amplifier is not designed for an 8-ohm impedance, at the impedance for which the amplifier is primarily designed, measured with all associated channels fully driven to rated per channel power. *Provided, however,*

when measuring maximum per channel output of self-powered combination speaker systems that employ two or more amplifiers dedicated to different portions of the audio frequency spectrum, such as those incorporated into combination subwoofer-satellite speaker systems, only those channels dedicated to the same audio frequency spectrum should be considered associated channels that need be fully driven simultaneously to rated per channel power.

(b) In addition, whenever any direct or indirect representation is made of the power output, power band or power frequency response, or distortion characteristics of sound power amplification equipment in any product brochure or manufacturer specification sheet, the following disclosures also shall be made clearly, conspicuously, and more prominently than any other representations or disclosures permitted under this part:

(1) The manufacturer's rated power band or power frequency response, in Hertz (Hz), for the rated power output required to be disclosed in paragraph (a) of this section; and

(2) The manufacturer's rated percentage of maximum total harmonic distortion at any power level from 250 mW to the rated power output, and its corresponding rated power band or power frequency response.

3. Section 432.3(c) is revised to read as follows:

§ 432.3 Standard test conditions.

* * * * *

(c) The amplifier shall be preconditioned by simultaneously operating all channels at one-eighth of rated power output for one hour using a sinusoidal wave at a frequency of

1,000 Hz; *provided, however,* that for amplifiers utilized as a component in a self-powered subwoofer system, the sinusoidal wave used as a preconditioning signal may be any frequency within the amplifier's intended operating bandwidth that will allow the amplifier to be driven to one-eighth of rated power for one hour;

* * * * *

By direction of the Commission.

Donald S. Clark
Secretary